

COMPOSITIONAL DEPENDENCE OF DENSITY, REFRACTIVE INDEX AND Dy^{3+} FLUORESCENCE IN LEAD AND BISMUTH BORATE GLASSES. Mahdy H. Almataawha, P.K.Babu, Saisudha B. Mallur *, Department of Physics, Western Illinois University, Macomb, IL-61455, SB-Mallur@wiu.edu

We studied the effect of host glass composition on physical properties (density, refractive index) and the fluorescence of dysprosium ions in lead borate and bismuth borate glasses. The PbO content of lead borate glasses were changed from 29.5 mol% to 69.5 mol% and Bi_2O_3 content from 29.5 mol% to 59.5 mol% in bismuth borate glasses. These glasses containing 0.5 mol% Dy_2O_3 were prepared by the usual melt quench method. Glasses were then annealed near the glass transition temperature (400°C) for 3 hrs. The densities of these glasses were found to increase gradually with increase in $\text{PbO}/\text{Bi}_2\text{O}_3$ content. The density of bismuth borate glasses is larger than the lead borate glasses for the same composition. Refractive indices were measured by Brewster angle method and it shows compositional dependence due to changes in the polarizability. Fluorescence spectra of all these samples were obtained using two different excitation wavelengths. The intensity of Dysprosium fluorescence depends on the concentration of $\text{PbO}/\text{Bi}_2\text{O}_3$ and also on the excitation wavelengths. This could be due to the host glass structural changes in the vicinity of dysprosium ions as well as energy transfer from lead/ bismuth ions to dysprosium ion.